

EXHIBIT 21

**Client Additional Services Authorization**

Date: 3-25-15

Project Name Flint WTP Phase II Segment I Initial Watermain Cut-in Flint WTP Phase II Segment I Rehab Flint WTP Ph II-Seg II - Lime Residual Disposal Flint Distribution System Modeling/Water Age Analysis	Additional Services Authorization No.
Client Name City of Flint	To Project No. 130-10701-001
Subject of Additional Services	Original Contract Date 6-26-2013

Description

Provide additional services as indicated below and detailed in the attached document for the four (4) projects listed above as noted:

- 1- Flint Distribution System Hydraulic Modeling Set Up, Calibration and Upgrade to include Field Testing Verification and Support; (\$99,900.00)
- 2- Flint Distribution System Water Age Analysis, Calibration and Flow Control Scenarios; (\$74,700.00)
- 3- Chlorine System Modification and Upgrade at PS4 associated with HSPs #1 & 2; (\$12,950)
- 4- Construction Management Services for all above projects; (\$28,800.00)
- 5- Design Water Treatment Plant Improvements associated with Veolia's Report and MDEQ Permitting; (\$147,840.00)
- 6- Project Engineering Services to facilitate the implementation of the recommendations by Veolia based on 60 hours/month for a total of five (5) months period; (\$54,000)
- 7- TTHM Report to address MDEQ Violation Notice for the next Two Quarters; (\$14,400)
- 8- Standard Operating Procedures/Checkoff lists Development for main processes and equipments at the plant; (\$21,600)
- 9- Design Assistance & Technical Support until KWA System is in Place @ \$10,000/month for 18 months; (\$180,000.00)
- 10- Jar Testing associated with Lake Huron Water as a source in preparation of KWA switch; (\$36,000)

Reason for Change

- 1) Modifications to the hydraulic model was needed to upgrade the model and calibrate to depict actual system performance and operation to include valve operational performance based on Service Center Report.
- 2) Coordination and Calibration of water System Performance and Operational Changes and Storage System Modifications to determine Water Age Analysis in the distribution system associated with the TTHM Issues and Chlorine Residual in the system.
- 3) Provide design changes to address upgrades to the Chlorine delivery system at PS4 for the piping connected to HSPs # 1&2.
- 4) Manage construction activities on behalf of the City with the selected contractors on all three projects.
- 5) Provide design changes associated with the recommendation of veolia's Team to incorporate permitting needs and design calculations required by MDEQ for approval.
- 6) Provide a project engineer to work with the City, MDEQ and the vendors to insure that Veolia's recommendations are implemented to the extent accepted by the City.
- 7) TTHM Report Update and Submittal to MDEQ for the next two Quarters
- 8) Compile Standard Operating Procedures and Checkoff lists for equipments and processes used by the City working with City staff and vendors and reviewing available O&M Manuals
- 9) Design Assistance & Technical Support to address treatment issues and operational controls until KWA Changes.
- 10) Conduct Jar Testing on Lake Huron Water in anticipation of KWA switch in June 2016 in order to assess operational needs and process changes at the Plant.

Compensation:	<input type="checkbox"/> Will be an amount equal to _____ times Salary Cost plus reimbursable expenses, both defined in the PROFESSIONAL SERVICES AGREEMENT , and in addition to the compensation for BASIC SERVICES . Total charges for these ADDITIONAL SERVICES are estimated to be approximately \$ _____.
	<input type="checkbox"/> Will be the lump sum of \$ _____ for these ADDITIONAL SERVICES .
	<input checked="" type="checkbox"/> Other <u>Cost plus based on current rates for a Total amount of \$670,190.00</u> (use reverse if necessary)

Completion:	Current Date	6-15-14	
	This Extension	13 months	
	New Date	7-15-16	
All terms and conditions of the original agreement remain in full force and effect.			
Proposed By:	Lockwood, Andrews & Newnam, Inc.		
	Warren Green, PE		3-30-15
	Print Name/Title	Signature	Date
Approved By	City of Flint		
	Client		
	Print Name/Title	Signature	Date
Execute in duplicate – (1) copy to Client, (1) copy to Accounting			

C-026-90

Detailed Scope Outline for Additional Services

Item #1 - Flint Water Model Update

- Verify transmission and distribution piping system using City's GIS, including pipe diameters
- Verify pipe C-factors
- Verify transmission and distribution system connections
- Verify facilities' piping for Filter plant and pumping stations, including piping layout, diameters and C-factors (use record drawings for piping)
- Obtain existing pump curves and motor data to confirm information in the model
- Confirm storage facility data, including volume and tank levels
- Spot check elevations for distribution system and facilities
- Obtain utility billing data for use in re-allocation of demands (electronic format is expected with service addresses and customer type)
- Process utility billing data
- Confirm system water loss using billing and pumpage data
- Re-allocate demands within model, including water loss
- Confirm closed system valves
- Re-confirm Filter plant and pump station operations
- Obtain flow data for Filter plant and pump stations to verify demand usage and peaking patterns (electronic format, 15- minute or hourly data)
- Obtain historical SCADA data to verify model replicates system operations, data needed includes plant, pump station and system pressures; tank levels and booster pump run times (electronic format, hourly data)
- Perform 60 hours of model field verification
- Document model update process and verification results
- Identify water lines to be flushed
- Perform model analyses to determine flushing requirements
- Identify discharge locations to be used during flushing
- Prepare system maps
- Outline flushing process / program
- Assist the City in executing flushing program

Item #2 - Flint Water System Water Age Analysis and 10 year CIP Planning

- Review MDEQ minimum system requirements and identify Flint's Water system compliance
- Develop water age mapping scenarios based on the updated system mapping and operational changes.
- Develop 5 and 10 year demands
- Develop 5 and 10 year average and peak day models and analyze system for improvements

- Perform fire flow analyses for the 5 and 10 year future systems
- Conduct 40 hours of pump station, reservoirs and WTP site visits and meetings.
- Discuss existing facility improvements already identified or desired by water system personnel
- Identify O&M CIP items
- Develop 10 year CIP
- Meet with City to discuss preliminary 10 year CIP and make revisions based on City's input
- Document 10 year CIP analyses and final CIP recommendations

Item #3 – Chlorine System Modification at PS4

- Develop design documents to provide chlorine system connection to HSPs 7 & 8 at PS4 so the system could be isolated for working on the new HSP #1 and valve replacements.
- Work with the contractor to amend existing construction contract and implement the new connection.
- Provide information to MDEQ for concurrence.

Item #4 - Construction Management Services

- Replenish funds used from this task to support other services outside the scope related to meetings, Veolia's involvement, technical committee participation, TTHM issues, etc.

Item #5 - Design Water Treatment Plant Improvements

- Evaluate and Provide design elements associated with implementing the filter change out to GAC.
- Coordinate with MDEQ design elements and get their approval to anticipated design changes.
- Review Veolia's information and develop CT analysis to verify design changes will meet MDEQ requirements.
- Meet with the City and MDEQ to get their approval to proceed.
- Assist the City if overseeing the implementation of the system change out in the filters.
- Coordinate with the contractor to insure proper implementation of design intent.

Item #6 - Project Engineering Services

- Provide a project engineer to work with City staff on an average of 15 hours/week or 60 hours/month.
- Coordinate between City staff, vendors, contractors and design professionals to insure timely implementation of design improvements needed to address TTHM issues.
- Work at the City Water Treatment Plant if the City desires.

- Develop an implementation schedule to help the City secure contractors and vendors to supply needed improvements to address TTHM recommendations in the next 5 months.

Item #7 - TTHM Report to address MDEQ Violation Notice

- Review sampling data and work with MDEQ and the City to update the operational report and resubmit to MDEQ as needed.

Item #8 - Standard Operating Procedures/Check off lists Development

- Review O& M Manuals at the WTP and summarize operational requirements into manageable SOPs for the staff to use.
- Work with City staff to understand their operational needs and develop check off lists to be used by the staff for routine and maintenance procedures.
- Work with vendors for the specific equipment/process at the plant to define key parameters to be put in SOPs for City staff to use and monitor.

Item #9 - Design Assistance & Technical Support until and during the Transition period into KWA

- Provide technical staff and support personnel for the next 18 months to address issues and provide guidance to City staff as needed.
- An estimated \$10,000/month is allocated to attend meetings, provide reviews, consult with City staff and provide design services outside current scope items as requested by the City.
- Provide coordination items between vendors and City staff as needed to facilitate operational progress of system processes.
- Be available for support services as needed to help with treatment issues or transition needs to KWA water source.

Item #10 - Jar Testing associated with Lake Huron Water

- Work with the County and MDEQ to establish some jar testing analysis in preparation for the KWA Lake water change out.
- Assist the City in reviewing and visiting comparable systems within the neighboring communities with similar water source.
- Coordinate with City staff the operational changes needed to switch from River water to Lake water as a source.